

Claims

[c1] 1. An earphone structure, comprising:

- a case;
- a main speaker and a plurality of sub-speakers, which are installed inside the case;
- a composite chamber, wherein the sub-speakers are disposed on the composite chamber for forming a composite room, such that the sound wave generated by the sub-speakers forms a composite sound field, and the sound wave generated by the sub-speakers as well as the sound wave generated by the main speaker are propagated out of the earphone; and
- a cover, wherein the cover and the case jointly cover the main speaker and the sub-speakers for forming the earphone structure.

[c2] 2. The earphone structure of claim 1, wherein the sub-speakers comprise a first channel speaker and a second channel speaker, which are disposed on two opposite sides of the composite chamber.

[c3] 3. The earphone structure of claim 2, wherein a position where the first channel speaker is disposed at and a position where the second channel speaker is disposed at

are not symmetrical.

- [c4] 4. The earphone structure of claim 2, wherein the sub-speakers further comprises a subwoofer speaker.
- [c5] 5. The earphone structure of claim 4, wherein the subwoofer speaker is disposed on a back side of the composite chamber.
- [c6] 6. The earphone structure of claim 1, wherein the composite chamber is a hollow column.
- [c7] 7. The earphone structure of claim 1, wherein some of the sub-speakers further comprises a sub-room with a specific physical structure.
- [c8] 8. The earphone structure of claim 7, wherein each of the sub-rooms is formed with a corresponding chamber.
- [c9] 9. The earphone structure of claim 8, wherein the chamber is a curve tube, and the curve tube has a specific curve angle.
- [c10] 10. The earphone structure of claim 9, wherein the curve angle of at least one of the curve tubes is within a range of 80 degrees to 100 degrees.
- [c11] 11. The earphone structure of claim 8, wherein the chamber is a grid plate, and the grid plate has a specific

curve angle.

- [c12] 12. The earphone structure of claim 11, wherein the curve angle of at least one of the grid plates is within a range of 80 degrees to 100 degrees.
- [c13] 13. The earphone structure of claim 8, wherein the chamber extends toward to a direction opposite to the composite chamber.
- [c14] 14. The earphone structure of claim 8, wherein the curve tube has a plurality of openings, and at least one pair of the openings are opposite to each other.
- [c15] 15. The earphone structure of claim 8, wherein one curve tube among the curve tubes has an opening facing to an internal side of the composite chamber, and the other curve tube among the curve tubes has an opening facing to an external side of the composite chamber and is close to the cover.
- [c16] 16. The earphone structure of claim 1, wherein the earphone structure receives a signal which has been processed by a sound field simulation process for generating a simulation sound field by the sub-speakers and the main speaker inside the earphone structure.
- [c17] 17. The earphone structure of claim 16, wherein the

sound field simulation process is designed based on a frequency-divided point of the sub-speakers.

- [c18] 18. The earphone structure of claim 16, wherein the sound field simulation process is designed based on a frequency-divided point of the sub-speakers and a delay process.
- [c19] 19. An earphone structure, comprising:
 - a case;
 - a main speaker and a plurality of sub-speakers, which are installed inside the case;
 - a plurality of composite chambers, wherein the sub-speakers are installed on the composite chambers for forming a composite room, and at least two of the sub-speakers are installed inside each of the composite chambers, such that the sound wave generated by the sub-speakers forms a composite sound field, and the sound wave generated by the sub-speakers as well as the sound wave generated by the main speaker are propagated out of the earphone; and
 - a cover, wherein the cover and the case jointly cover the main speaker and the sub-speakers for forming the earphone structure.
- [c20] 20. The earphone structure of claim 19, wherein the sub-speakers comprise a first channel speaker and a

second channel speaker, which are disposed on two opposite sides of the same composite chamber.

- [c21] 21. The earphone structure of claim 20, wherein a position where the first channel speaker is disposed at and a position where the second channel speaker is disposed at are not symmetrical.
- [c22] 22. The earphone structure of claim 21, wherein the sub-speakers further comprises a subwoofer speaker.
- [c23] 23. The earphone structure of claim 22, wherein the subwoofer speaker is disposed on a back side of the composite chamber.
- [c24] 24. The earphone structure of claim 19, wherein the composite chamber is a hollow column.
- [c25] 25. The earphone structure of claim 17, wherein some of the sub-speakers further comprise a sub-room with a specific physical structure.
- [c26] 26. The earphone structure of claim 25, wherein each of the sub-rooms is formed with a corresponding chamber.
- [c27] 27. The earphone structure of claim 26, wherein the chamber is a curve tube, and the curve tube has a specific curve angle.

- [c28] 28. The earphone structure of claim 27, wherein the curve angle of at least one of the curve tubes is within a range of 80 degrees to 100 degrees.
- [c29] 29. The earphone structure of claim 26, wherein the chamber is a grid plate, and the grid plate has a specific curve angle.
- [c30] 30. The earphone structure of claim 29, wherein the curve angle of at least one of the grid plates is within a range of 80 degrees to 100 degrees.
- [c31] 31. The earphone structure of claim 26, wherein the chamber extends toward to a direction opposite to the composite chamber.
- [c32] 32. The earphone structure of claim 26, wherein the curve tube has a plurality of openings, and at least one pair of the openings are opposite to each other.
- [c33] 33. The earphone structure of claim 26, wherein one curve tube among the curve tubes has an opening facing to an internal side of the composite chamber, and the other curve tube among the curve tubes has an opening facing to an external side of the composite chamber and is close to the cover.
- [c34] 34. The earphone structure of claim 19, wherein the ear-

phone structure receives a signal which has been processed by a sound field simulation process for generating a simulation sound field by the sub-speakers and the main speaker inside the composite chamber.

- [c35] 35. The earphone structure of claim 34, wherein the sound field simulation process is designed based on a frequency-divided point of the sub-speakers.
- [c36] 36. The earphone structure of claim 34, wherein the sound field simulation process is designed based on a frequency-divided point of the sub-speakers and a delay process.
- [c37] 37. An earphone structure, comprising:
 - a case;
 - a plurality of sub-speakers;
 - a composite chamber, wherein the sub-speakers are disposed on the composite chamber for forming a composite room, such that the sound wave generated by the sub-speakers forms a composite sound field; and
 - a cover, wherein the cover and the case jointly cover the composite chamber for forming the earphone structure.
- [c38] 38. The earphone structure of claim 37, wherein the sub-speakers comprise a first channel speaker and a second channel speaker, which are disposed on two op-

posite sides of the composite chamber.

- [c39] 39. The earphone structure of claim 38, wherein a position where the first channel speaker is disposed at and a position where the second channel speaker is disposed at are not symmetrical.
- [c40] 40. The earphone structure of claim 38, wherein the sub-speakers further comprises a subwoofer speaker.
- [c41] 41. The earphone structure of claim 40, wherein the subwoofer speaker is disposed on a back side of the composite chamber.
- [c42] 42. The earphone structure of claim 37, wherein the composite chamber is a hollow column.
- [c43] 43. The earphone structure of claim 37, wherein some of the sub-speakers further comprises a sub-room with a specific physical structure.
- [c44] 44. The earphone structure of claim 43, wherein each of the sub-rooms is formed with a corresponding chamber.
- [c45] 45. The earphone structure of claim 44, wherein the chamber is a curve tube, and the curve tube has a specific curve angle.
- [c46] 46. The earphone structure of claim 45, wherein the

curve angle of at least one of the curve tubes is within a range of 80 degrees to 100 degrees.

- [c47] 47. The earphone structure of claim 44, wherein the chamber is a grid plate, and the grid plate has a specific curve angle.
- [c48] 48. The earphone structure of claim 47, wherein the curve angle of at least one of the grid plates is within a range of 80 degrees to 100 degrees.
- [c49] 49. The earphone structure of claim 44, wherein the chamber extends toward to a direction opposite to the composite chamber.
- [c50] 50. The earphone structure of claim 44, wherein the curve tube has a plurality of openings, and at least one pair of the openings are opposite to each other.
- [c51] 51. The earphone structure of claim 44, wherein one curve tube among the curve tubes has an opening facing to an internal side of the composite chamber, and the other curve tube among the curve tubes has an opening facing to an external side of the composite chamber and is close to the cover.
- [c52] 52. The earphone structure of claim 37, wherein the earphone structure receives a signal which has been pro-

cessed by a sound field simulation process for generating a simulation sound field by the sub-speakers and the main speaker inside the composite chamber.

- [c53] 53. The earphone structure of claim 52, wherein the sound field simulation process is designed based on a frequency-divided point of the sub-speakers.
- [c54] 54. The earphone structure of claim 52, wherein the sound field simulation process is designed based on a frequency-divided point of the sub-speakers and a delay process.
- [c55] 55. An earphone structure comprising a composite chamber and being disposed inside a case and a cover, wherein the case and the cover jointly cover the composite chamber for forming the earphone structure, and the composite chamber receives a plurality of sound source signals and forms a composite room, such that a composite sound field is formed by the sound source signals.
- [c56] 56. The earphone structure of claim 55, wherein the sound source signals at least comprise a first sound source signal and a second sound source signal, which are originated at opposite sides of the composite chamber, respectively.
- [c57] 57. The earphone structure of claim 56, wherein a loca-

tion where the first sound source signal is originated at and a location where the second sound source signal is originated at on the opposite sides of the composite chamber are not symmetrical.

- [c58] 58. The earphone structure of claim 56, wherein the sound source signals further comprise at least a subwoofer sound source signal.
- [c59] 59. The earphone structure of claim 58, wherein the subwoofer sound source signal is originated at a back side of the composite chamber.
- [c60] 60. The earphone structure of claim 55, wherein the sound source signals are the signals which have been processed by a sound field simulation process for generating a simulation sound field in the composite chamber.
- [c61] 61. The earphone structure of claim 60, wherein the sound field simulation process is designed based on a frequency-divided point of the sound source signals.
- [c62] 62. The earphone structure of claim 60, wherein the sound field simulation process is designed based on a frequency-divided point of the sound source signals and a delay process.
- [c63] 63. An earphone structure comprising a composite

chamber and being installed inside a case and a cover, wherein the case and the cover jointly cover the composite chamber for forming the earphone structure, and the composite chamber receives a plurality of sound source entities and forms a composite room, such that a composite sound field is formed by the sound source entities.

- [c64] 64. The earphone structure of claim 55, wherein the sound source entities at least comprise a first sound source signal and a second sound source signal, which are originated at both opposite sides of the composite chamber, respectively.
- [c65] 65. The earphone structure of claim 64, wherein a position where the first sound source entity is originated at and a position where the second sound source entity is originated at both opposite sides of the composite chamber are not symmetrical.
- [c66] 66. The earphone structure of claim 64, wherein the sound source entities further comprise at least a subwoofer sound source entity.
- [c67] 67. The earphone structure of claim 66, wherein the subwoofer sound source entity is originated at a back side of the composite chamber.

- [c68] 68. The earphone structure of claim 63, wherein the sound source entities are the signals which have been processed by a sound field simulation process for generating a simulation sound field in the composite chamber.
- [c69] 69. The earphone structure of claim 68, wherein the sound field simulation process is designed based on a frequency-divided point of the sound source entities.
- [c70] 70. The earphone structure of claim 68, wherein the sound field simulation process is designed based on a frequency-divided point of the sound source entities and a delay process.